



## Intercollegiate Broadcasting System

BETHLEHEM, PA.

MAY 2 1965

# ENGINEERING INFORMATION

### Toroidal Cores

As promised at the engineering session of the twenty-seventh National Convention below is the information on two toroid manufacturers for loading units and transmission line splitters. For the benefit of those not present the major points in the construction of these units will also be noted.

A toroid suitable for use in both loading units and splitters is manufactured by both of the following companies. The toroid called for is adequate for the power levels in use by most carrier current stations.

Indiana General Corp., Crows Mill Rd., Keasbey, N. J.  
Ferramic Q-1 material, toroid part number CF-114  
price: 1-24: \$2.10; 25-49 \$1.60. Minimum order: \$25.00

Custom Components Co., Att: Roy Olerud, Box 248,  
Caldwell, N. J. Fairmag #1 material, toroid core number  
TF1273. Price: 1-24: \$0.70; 25-99: 40.60. Min order \$15.00

This toroid is a stock item and is 1.25" outside diameter, 0.75" inside diameter and 0.375" thick. The magnetic path length is 3.14" and the cross sectional area is 0.0938 square inches. The basic magnetic properties are:  $\mu_0 = 125$  at 1 MHz,  $\mu_{\max} = 400$ , and  $B_s @ H = 25$  oersteds = 3300 gauss. Both manufacturers make other core shapes and sizes of this material.

For theory of loading units and transmission line splitters refer to the IBS Master Handbook pages 52.92 to 52.95R. To avoid resonance due to stray capacitance the maximum number of turns in the primary should be 50, this would give an inductance of 275 uh. A more ideal number of turns would be 35 giving an inductance of 125 uh. To get maximum coupling between primary and secondary both windings should be spread over the entire circumference of the core even though this would cause crossing of turns. The voltage levels involved are such as not to cause arcing.

To avoid sixty cycle current through the secondary the loading unit should be wired as in Figure Two on MH page 52.93R. If all the hot wires are tied to an unbalanced secondary through identical coupling capacitors the AC currents cancel at the junction. Excessive sixty cycle current through the secondary can cause the core to saturate impressing a 120 cycle modulation on the RF carrier.

To meet UL requirements and prevent ground currents in the RF distribution system the neutral of the power system should only be tied to the secondary of the loading unit transformer. The AC ground (neutral) should be isolated from both the case ground and the coaxial cable or transmitter ground.

For those interested in purchasing some inexpensive oil bathtub capacitors Herbach and Rademan Inc., 1204 Arch Street, Philadelphia, Penna. 19107 advertized some three section 0.1 mf. 600 volt units at ten for one dollar in their "This Month" catalog (Vol. 32 Number 3 page 25). Write to them for purchasing details. These units would be ideal for loading units. Other capacitance values are also available at a higher price.

For ease of reference file this page after page 52.93 in your Master Handbook.

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April 1966